A REGIONAL ORTHOPAEDIC AND ACCIDENT SERVICE

BY

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A few months ago this *Journal* (Oct. 23, 1948, p. 751) approved a short publication of mine on the organization of a Regional Orthopaedic and Accident Service within the National Health Service, and asked for further information. I am now trying to answer the questions; but as that article was written a year ago, when we knew very little about regional machinery, it is best to include a brief general review.

An Outline of the Service

A comprehensive orthopaedic and accident service should cover: (a) Acute diseases affecting the locomotor system, together with accidents of all kinds. These conditions require a 24-hour service in all the area hospitals of the region, best run in each such hospital under an orthopaedic and accident surgeon who lives in its vicinity. While the great majority of accidents involve the locomotor system, there may be damage to eye, brain, thorax, abdomen, etc.: thus the man in charge often requires the expert assistance of his colleagues in other branches of surgery. (b) The multiplicity of cases of congenital or acquired deformity, insidious disease, and so on, which may be termed the "cold" orthopaedics of the scattered clinics and the orthopaedic hospital.

There may be one or several orthopaedic hospitals in a region. In the Oxford region there are two—the Manfield, at Northampton, and the Wingfield-Morris, at Oxford. My illustrations are taken from the latter, for which I have worked in a regional service for nearly 30 years.

In order to understand and appreciate the organization of a modern orthopaedic service the reader should bear in mind from the beginning two rather special considerations which are easily overlooked. The first is the necessity for widely scattered out-patient facilities for diagnosis and treatment. In "cold" orthopaedics children form a majority of the patients, and in this work *very early discovery, prompt effective treatment, and prolonged aftercare* are the three fundamental conditions of success. Now, a mother finds great difficulty in taking her child to a distant hospital; indeed, she will seldom do so unless the doctor's advice is reinforced by the child's obvious need. Thus the lack of a clinic within easy reach may be very harmful. If an early diagnosis is to be made the patient should be seen by an experienced specialist long before anything serious or painful is evident, and if cure is to be assured attendance must be kept up long after the success of treatment is apparent (and to the mother fully satisfying). For these reasons clinics within easy reach of every village in the region are regularly attended by the staff of the central orthopaedic hospital. In these neighbourly clinics early diagnosis is achieved much more often than would otherwise be possible, and the prolonged periodic follow-up which so many orthopaedic cases require is facilitated. This is no theoretical statement, but the outcome of ample experience.

Though many of these clinics are held in hospitals they are, taken together, the out-patient department of the central orthopaedic hospital, extended for the benefit of its distant patients. For three reasons it is essential that members of the senior surgical staff should visit the clinics: first, because very early diagnosis of major conditions is a matter demanding considerable experience and judgment; secondly, because the achievement of a full correction of these innumerable minor cases demands much co-operation from the parents, which can seldom be achieved without the authority and influence of a senior specialist; and, thirdly, because prolonged follow-up is far better carried out by a senior man who attends the clinic continuously year after year.

The second consideration concerns "cold" orthopaedics—a slow-moving complex field of work, in which sound judgment grows very slowly with experience and much failure and frustration, or fairly quickly and without failure and frustration by membership of a team of men, seniors and juniors, with all the opportunities of guidance and discussion

that this gives. It is characteristic of "cold" orthopaedics that a surgeon is often unable to distinguish between the ultimate success or failure of his treatment, or to assess the relative value of different methods of treatment, until years have passed. Furthermore, the great variety of disorders of the locomotor system afford a dangerously wide scope for invention: indeed, much ingenuity has been exercised in many centres for many years, with results varying from beneficial to disastrous. This is a potent reason for the frequent demonstration, examination, and free discussion of cases which will save the younger men from trying over again methods which appear excellent but have proved unsound. At the Wingfield the whole staff meets twice a week, spending about an hour and a half on the examination (in one room) and discussion (in another) of five or six patients, new and old. This is the soundest possible source of learning.

A regional orthopaedic and accident service can be organized on the following pattern.

A. Central Orthopaedic Hospital

The whole organization is built round the central orthopaedic hospital, which in a regional centre is likely to form the clinical field of the medical school. It is probably better that it should be under the Regional Hospital Board than be regarded as part of the teaching hospital, and that it should have its own individual board of management. There may be more than one first-class orthopaedic hospital in a region, each the centre of its own regional organization.

These hospitals have a number of special characteristics: (a) wards designed for treatment in open air and sunshine; (b) theatres with every possible means of promoting asepsis and, preferably, a Plenum system of filtered-air ventilation; (c) plaster-rooms with much special equipment; (d) first-class radiographic and photographic departments; (e) physiotherapy with treatment baths for anterior poliomyelitis and much other special equipment, and staffed by experts; (f) occupational therapy; (g) school teachers for the education of children of school age (2-16) grouped suitably by ages in wards; (h) workshops equipped and staffed for the quick and exact manufacture and fitting of splints, and research into new designs and new material.

Hospital Records.—That clinical records should be full and accurate is of particular importance in an orthopaedic hospital because many of its patients are under treatment from time to time over many years, and without explicit and reliable records the progress, whether improvement or deterioration, may be impossible to assess with any accuracy. Here the visual records of photographs "before and after" and of small individual "before and after" loops of cinematograph film are of extraordinary value; for by these demonstrative and realistic means the surgeon is made fully aware of the effects, good or bad, of his treatment.

Research.—The opportunities for clinical research are many, the need is great—perhaps especially for more exact knowledge on the relative value of different methods of treatment, based on written, radiographic, photographic, and cinephoto records before and after. Each orthopaedic hospital ought to keep such records and make accurate assessment of its end-results in complete series of cases. It would find the material wholesome for its own consumption; and it could thus contribute to the general knowledge of orthopaedics. It is desirable that members of the surgical staff should be given an opportunity of taking part in animal research in university laboratories.

Library.—There should be a good medical library, with facilities for reading, writing, and dictation for all members of the staff.

Pathology.—For regional work the clinical pathology is carried out in laboratories under the supervision of the senior clinical pathologist of the teaching hospital. This seems preferable to a completely independent system of laboratories.

B. Regional Staff—Central Orthopaedic Hospital

Director of Orthopaedic Services.—The clinical administration of the Regional Orthopaedic Service within the central orthopaedic hospital and throughout the region is best entrusted to one of the surgeons, who will of course work in the closest

touch with his colleagues as a member of the Staff Committee. Much of his work is clinical administration; some of it is clerical, to co-ordinate and facilitate the working of the organization. Most of his decisions are made after full discussion with the Staff Committee; particularly will this be so when something has to be done to improve an unsatisfactory service. If he should turn out to be too much of a "director" he can be replaced. The post should not itself carry any extra emolument; so that if a change of directorship should be desirable it may be made without financial disturbance.

Regional Consultants.—Several of the senior surgeons of the central orthopaedic hospital should be recognized as regional consultants and be responsible for the orthopaedic departments in the area hospitals. Each of these men will visit one or more such hospitals every week. Here he will have the assistance of the local orthopaedic and accident surgeon, and they should work intimately together in the wards, theatre, and out-patient department.

Specialist Surgeons.—A number of surgeons who have not yet reached regional consultant rank complete the surgical staff of the central orthopaedic hospital, which should provide about one surgeon to every 50 beds. The work of the staff covers the intramural work of the central orthopaedic hospital, the orthopaedic and accident departments of the central and area general hospitals, and the outlying clinics.

Professor of Orthopaedic Surgery.—Where the regional hospital is closely associated with a teaching hospital its staff may include a professor of orthopaedic surgery, who, with his first assistant, can be given charge of one of the units of the hospital. He thus plays his part in the regional work of the hospital. He is responsible to the university for the organization and carrying out of all academic activities throughout the hospital. In an article so general as this it is hardly possible to specify the relations between the regional director, with his widespread administrative and co-ordinating duties, and the professor, with his academic interests. Much will depend on individual circumstances. Their functions should always be mutually helpful.

The establishment of resident staff is as follows. At the central orthopaedic hospital, with, say, five surgical units: one resident of senior registrar status and five house-surgeons of junior registrar status. At each of the area hospitals with accident and orthopaedic departments the services of a man of senior registrar status and a house-surgeon are required.

C. Area Hospitals

In the area hospitals—i.e., the principal general hospitals of the region—there are (1) the orthopaedic department, mainly for out-patient service, but with some beds for short-stay cases; and (2) the accident service.

The staffing of these outlying units is of particular concern. The orthopaedic and accident work should be closely co-ordinated. It is essential that the surgeon in charge of the service should be a member of the regional orthopaedic team. The best arrangement is that the visiting regional orthopaedic consultant who is responsible for the orthopaedic department of the area hospital should also be consultant to its accident service and be prepared to see difficult cases and discuss problems with the accident surgeon, and that the latter, in turn, should work in the orthopaedic department as assistant surgeon (to use the old term), and be on the staff of the central orthopaedic hospital. For these outlying posts it is possible to pick from a strong field of candidates a man with sound experience of the accident side of orthopaedics, with a Fellowship, and with a background of sound surgical training. But for the most part, when appointed, he has not had very much experience of "cold" orthopaedics.

Nevertheless these men are from the first active and valuable members of the orthopaedic staff of the region, not only taking care of orthopaedic emergencies (their primary service), but also helping the visiting consultant to cope with the flood of "cold" orthopaedics which comes to an area hospital. Their value in this field will increase as they accept the opportunities of absorbing orthopaedics from their association with the central orthopaedic hospital. Whenever possible, they take part in the clinical conferences at that hospital as a member

of its staff and on sessional duty. Even if the pressure of work makes some of these visits to the centre impracticable they have the advantage of close association with an orthopaedic specialist who has been working in that intensive school for years. Thus, for example, in the southern part of the Oxford region there is in view a staff of five whole-time surgeons living at the centre, with four men working in and living near the area hospitals.

There is a tendency to speak of major and minor orthopaedic cases and to set up a distinction between them in regard to their need of specialist skill—let us say between the lesions of the spine and the larger joints and those of the hand or foot. This is a mistake. The smaller tasks are often the more delicate and intricate, requiring as much judgment and more exact technique—and what happens to his hand or foot is of major, not minor, importance to the patient. But many of these short-stay cases make no special demands on hospital design and equipment, and therefore need not be admitted to the central orthopaedic hospital.

D. Outlying Clinics

A certain number of *ad hoc* orthopaedic clinics in the smaller towns have been found necessary, in addition to the orthopaedic out-patient clinics of the general hospital, in order to bring the means of specialist diagnosis, treatment, and after-care within the easy reach of patients, particularly children, in every part of the region.

E. Proportion of Beds to Population

It is probable, judging from our own experience at the Wingfield, that about 300 beds per million population are sufficient, provided that the beds in the central orthopaedic hospital are supplemented by provision of a total of 40 or 50 beds for short cases in the associated general hospitals. Orthopaedic hospitals do, however, differ considerably in regard to the type of cases they admit. In the Wingfield we have always had a considerable proportion of active orthopaedics—i.e., acute inflammation or injury of any part of the locomotor system—a good many cases of difficult fractures, non-unions, mal-unions, and so on, and internal derangement of joints. On the other hand, by a very closely knit system of orthopaedic clinics we are able to allow patients to leave hospital very much earlier than is otherwise possible. Almost all our patients go home a few days after first getting out of bed.

F. Aftercare Sisters—Orthopaedic Physiotherapists

These are highly trained girls who have obtained a certificate in orthopaedic nursing, are members of the Chartered Society of Physiotherapy, and have had a postgraduate training in the great variety of plaster and splint work used in orthopaedics. This triple training makes them invaluable in out-patient orthopaedic work of every kind, as well as in the plaster-room of the central and area hospitals. Their responsibilities and duties have hitherto been primarily those of working for the orthopaedic surgeons in the plaster-rooms of the central orthopaedic hospital, in the out-patient departments of the area hospitals, and in the outlying clinics. But they have carried in addition the responsibility of attending the outlying clinics weekly between the surgeon's periodic visits and carrying on treatment by remedial exercises, plaster work, and the supervision of splintage. Their remedial exercise work is largely class-work, made effective by their capacity to impress upon the mothers of the children the importance of keeping up these exercises and maintaining good posture during the intervening period. This is simple and economical, and can be a most effective way of getting rid of postural defects, with far less interference with school-time than is necessitated by the regular attendance of children at the hospital or clinic for daily remedial exercises. It is noteworthy that, at a census taken in 1927, of 540 children under treatment at clinics in Berks, Bucks and Oxon, 509 were attending school.

The number of children attending the clinics is, of course, only a small proportion, probably a very small fraction, of the number who need remedial exercises. Here we see the immense advantage of close liaison between the orthopaedic personnel and the School Medical Service, with organizers of remedial exercises associated with that Service. This association is

valuable both in regard to the supervision of the right sort of exercises in schools by the School Service and in promoting the recognition of those types of deformity which call for the attendance of the child at an orthopaedic clinic for diagnosis and treatment.

Our staff numbers five fully trained members and one under-going postgraduate training. They live in the neighbourhood of the central orthopaedic hospital. Their time is divided in about equal proportions between work in the central orthopaedic hospital and the outside hospitals and clinics.

Three Important Questions

Three questions remain to be answered—those of cases of acute anterior poliomyelitis, combined pulmonary and skeletal tuberculosis, and workshops.

Acute Anterior Poliomyelitis.—In general, cases of acute anterior poliomyelitis can be admitted and isolated in the central orthopaedic hospital as soon as they can safely be moved. It is probable that more can be done to minimize the severity of paralysis during the first three weeks than at any subsequent stage. In a time of epidemic, however, there is likely to be too great a rush of cases for this immediate admission and isolation to be practicable; therefore a sufficient number of beds in an isolation hospital within easy reach of the central orthopaedic hospital should be allocated to meet this need, and the patients placed under the joint care of the isolation medical and nursing staff on the one hand and the orthopaedic surgeons and aftercare sisters on the other. Where such ready co-operation can be promoted the effect is admirable. As the patients pass out of quarantine they can be admitted to the orthopaedic hospital.

Combined Pulmonary and Skeletal Tuberculosis.—Pulmonary tuberculosis is best treated in a sanatorium, and skeletal tuberculosis is best treated in an orthopaedic hospital where the surgeon and his resident staff devote their whole time to the study and care of the locomotor system, and where constant practice makes the nurses capable of ensuring the comfortable, effective, and long-continued immobilization of a hip or a spine on a frame or in plaster. It is recommended that a special unit should be developed for this work in every region, as convenient as possible for the physicians, and surgeons concerned. Experienced nurses, prepared for long-term service, are necessary, for only thus can their patients be given comfort and confidence through a lengthy period of confinement which is always difficult and can be very distressing.

Workshops.—I can best answer this question by saying that our Wingfield workshops have been fulfilling the needs of the Wingfield Hospital and its clinics, together with some work, mainly but not exclusively orthopaedic, for the Radcliffe Infirmary, Oxford, the Royal Berkshire Hospital, Reading, the Royal Buckinghamshire Hospital, Aylesbury, the R.A.F. Hospital at Halton, and the Ministry of Pensions Hospital at Stoke Mandeville. It is probable that this workshop staff and equipment could serve a regional orthopaedic and accident service for a population of at least a million. Our staff and space consist of:

Superintendent	Office, 68 sq. ft. (6.3 sq. m.)
Clerks (2)	General office, 220 sq. ft. (20.4 sq. m.)
Boot repair dept. (9) ..	680 sq. ft. (63 sq. m.)
Machine shop (6)	(including one blacksmith) machine shop, 864 sq. ft. (80 sq. m.); forge, 130 sq. ft. (12 sq. m.); welding, 81 sq. ft. (7.5 sq. m.)
Carpenter's shop (1) ..	490 sq. ft. (45.5 sq. m.)
Saddlers (3)	432 sq. ft. (40 sq. m.)
Stores	306 sq. ft. (28.4 sq. m.)
Fitting-room	180 sq. ft. (16.7 sq. m.)
Waiting-room	54 sq. ft. (5 sq. m.)
Dispatch-room	80 sq. ft. (7.4 sq. m.)

Conclusions

A Regional Orthopaedic and Accident Service can render a high standard of service if the personnel is first-rate and works as a team in a well-planned and complete organization. The orthopaedic and accident services should be closely articulated in those parts of the region where they are not fused. In the area hospitals a local orthopaedic and accident surgeon is

in immediate charge of the work as a member of the regional team. The orthopaedic service is directed from the central orthopaedic hospital, with an out-patient department in every hospital and in sufficient additional clinics to bring a consultant frequently within reasonable reach of every village in the region. This arrangement and other extramural organization are necessary to bring about early diagnosis, regular attendance, and thorough follow-up. The efficiency of treatment depends on the ability, spirit, and character of the members of the team; for in truth much of the clinic work will prove tedious to the staff, and largely ineffective to the patient, unless it is tackled with obvious and infectious interest. Though organization can facilitate their attendance, patients will keep coming only if they understand what is being done for them and why it must go on so long.

Orthopaedic work must be very good or it is marred by frequent failure and much disappointment. It demands a great deal of skill and effort from all concerned, and particularly is this true of "cold" orthopaedics, for in this field there is often a strong tendency towards recurrence of deformity, with as much harm as help from *vis medicatrix naturae*.

My work for the E.M.S. in two regions during the war made me acutely aware of the needless suffering that was being endured and the disablement that was being promoted in reputable hospitals as a result of members of their surgical staff treating fractures in an atmosphere of isolation and seclusion. For example, I found a young soldier who had suffered a compound fracture of the femur a few days before, in great pain and distress. His lower limb was tightly bandaged to a long Liston splint, the upper part of which was completely free in the bed and some distance from the trunk. The fracture was uncontrolled and in obvious varus deformity, and I was told that the splint was detached daily for dressings.

Regional Hospital Boards have indeed grave responsibility—and great opportunity. They can put an end to a long epoch of isolation and seclusion in which the work of individual surgeons all over the country has been good, bad, or indifferent. Isolation bred incompetence, seclusion hid it, and no one could do anything about it.

Each Board must aim at a sound organization, staffed by a team of men who share their advance in knowledge and clinical experience, a team who will thus come to be distinguished by the diffusion of a high standard of skill and a spirit of whole-hearted service. In order to achieve such a team there must be some devolution of authority step by step from the Director of Orthopaedic Services right through his senior and junior colleagues, the resident staff, and all the personnel of ancillary departments and clinics. Since the team is animated by a common purpose this authority can be exercised almost entirely by the guidance and personal influence of the senior men. When, however, a man continues to prove himself unable to render first-class service his appointment must be terminated by the Board.

The regional organization on which this article is based has been tried over many years, and has earned the approval of local authorities, voluntary hospitals, and all concerned. How far it can be applied to other specialties I do not know—probably only in some of its features. It seems likely that a considerable number of autonomous areas will be required for medicine, for surgery, and for gynaecology. No doubt, too, a pattern which suits the country as a whole will be modified for the service of industrial areas with great density of population.

In many regions local associations for the care of cripples will be found; these are voluntary bodies capable of giving most valuable help to the secretaries, almoners, and surgeons of orthopaedic hospitals.

The American people are contributing funds to finance a campaign against heart disease. The American Heart Association is seeking five million dollars to carry out research, to spread information about the disease, and to provide community services for its victims. President Truman has urged that the utmost support of governmental and voluntary organizations be given, and said recently, "Combating the nation's leading cause of death has become our most serious national health problem."